

MINNESOTA CODE: KEEPING THE HEAT IN WHILE TAKING THE PRESSURE OFF

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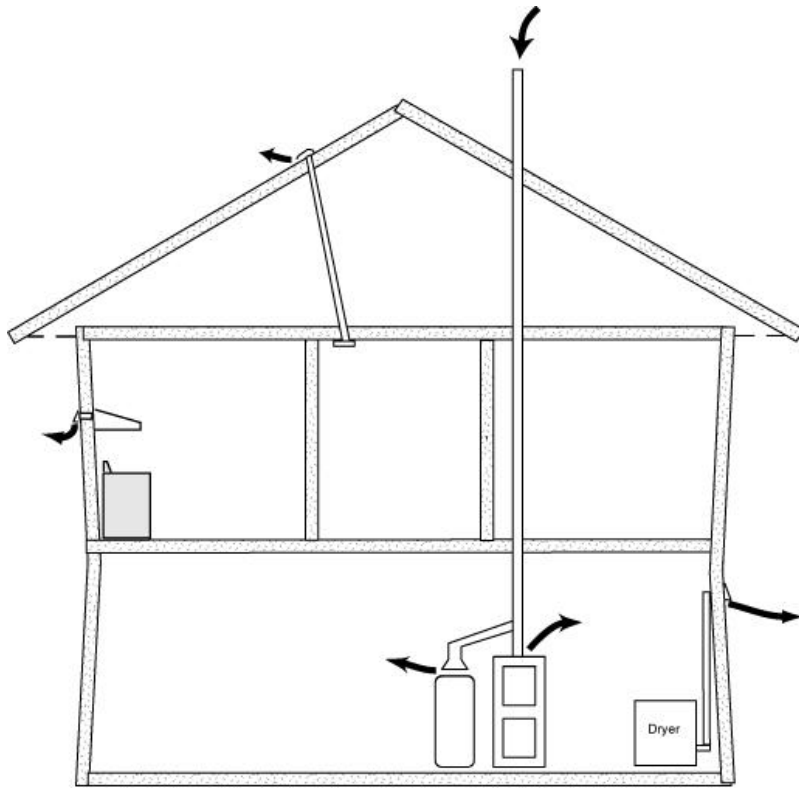
Three types of air

- Combustion air
 - for vented combustion appliances
- Ventilation air
 - for indoor air quality
- Make-up air
 - to compensate for additional mechanical exhausting devices

Protection Against Excessive Depressurization

- Houses being built tighter
 - Construction materials (sheet goods)
 - Consumer demands for comfort & efficiency
- Exhaust appliances having larger capacities
 - Range hoods 800 to 1,000 CFM and above
 - Clothes dryers recently increased to 225 cfm
- Exhaust appliances do not provide for replacement of exhausted air

Protection against excessive depressurization



- exhaust fans such as kitchen range hoods, clothes dryers, and other fans all cause negative pressure within the home & may cause backdrafting

Energy Code Prescriptive Paths

Protection against excessive depressurization

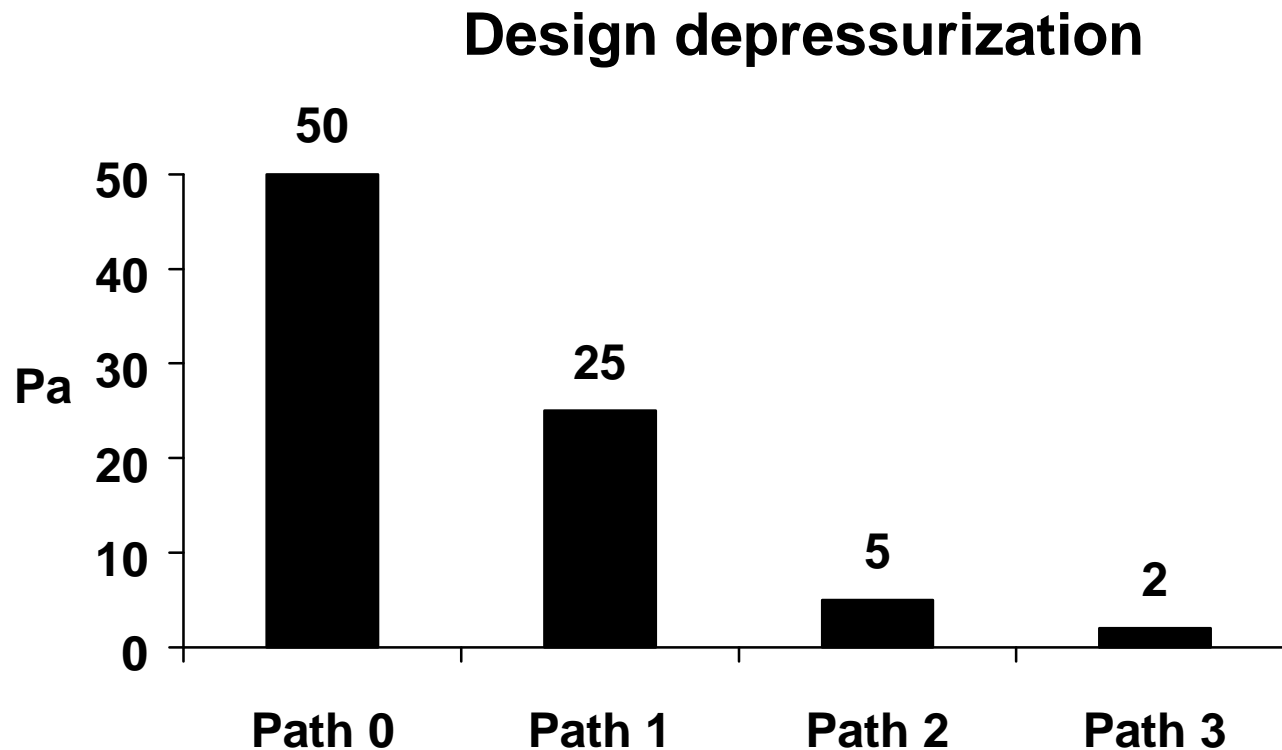
- the energy code identifies three prescriptive paths and a performance path
- different levels of make-up air are required to compensate for exhaust fans, depending upon the susceptibility to backdrafting of vented combustion appliances

Prescriptive Path Procedure

- Step 1 -- choose equipment (space heating, water heating, hearth products)
- Step 2 -- identify which compliance Path is appropriate for the equipment chosen
- Step 3 -- specify equipment for ventilation system and make-up air based on Path requirements

Minnesota Energy Code

Protection against excessive depressurization



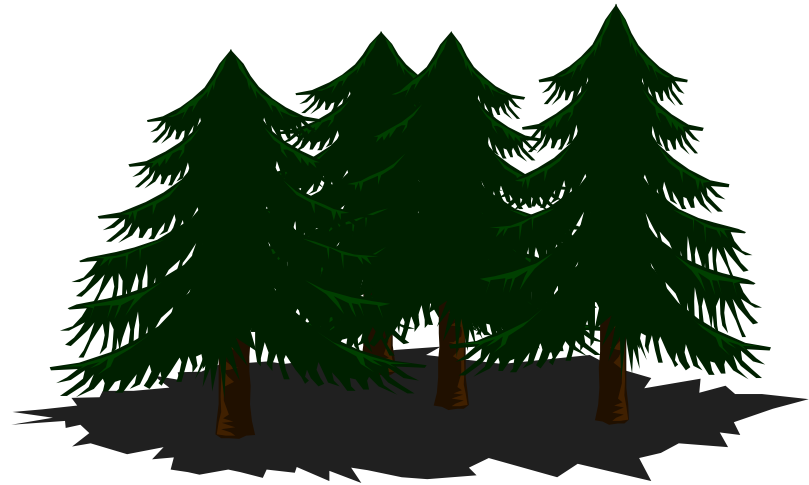
Energy Code Performance Path

Protection against excessive depressurization

- the house is tested according to specified test procedures
- the pressure within the dwelling unit must not decrease from atmospheric pressure by more than can be tolerated by the combustion appliances within the house
- The Spillage Test, CAN/CGSB-51.71-95

VENTILATION

- The best ventilation is an open window
- Except:
 - when it's cold
 - when it's hot
 - when the occupant has pollen allergies
 - when security is an issue
 - when noise is a concern



Mechanical Ventilation Requirements

- VENTILATION QUANTITY
- EQUIPMENT REQUIREMENTS
- DISTRIBUTION AND INSTALLATION

Ventilation Quantity

- Total ventilation rate is 0.35 air changes per hour (ACH)
 - Calculated as the house conditioned square footage (which normally would include the basement) multiplied by 0.05
- People ventilation is 15 cfm for each bedroom plus an additional 15 cfm (minimum people ventilation rate is 45 cfm)

Total Ventilation

People Ventilation

- Total ventilation (People + Supplemental) is used for when increased occupancy in the house, or during cooking or cleaning
- People ventilation for continuous operation or at least whenever the house is occupied

Ventilation Equipment - Fans

- Fans providing people ventilation:
 - must be listed for continuous operation
 - must have a sound rating of 1.5 sones or less
 - surface mounted fans must have a maximum sound rating of 1.0 sone
 - Note: HRVs are not rated for sound at this time

If a Heat Recovery Ventilator is Installed, it Must:

- meet Canadian standard CSA-439
 - an alternate to a portion of this standard may be used to certify cold weather performance
- meet UL standard 1812 or equivalent
- have a permanent label indicating the ventilation capacity and tested performance

Ventilation System Distribution and Installation

- Room ventilation air inlets with design flow greater than 20 cfm must temper incoming air
- this is usually done by one or more of:
 - a heat recovery ventilator
 - mixing with house air in furnace duct work
 - using a duct heater

Ventilation System

Furnace Duct Connections

- provisions must be made to avoid ventilation air short circuiting through the furnace ductwork
- if the ventilation system is using the forced-air distribution system for delivery
 - then furnace blower must run on low speed or cycle ON for 20 minutes of each hour

Ventilation System

Furnace Duct Connections

- if both exhaust and supply ventilation system ducts connect to furnace ducts:
 - the furnace blower must run whenever the residential ventilation system is running
 - ventilation exhaust duct must be at least 3 feet upstream of outdoor air duct

Ventilation System Installation Requirements

- must verify that system is installed and working properly
- must include a measurement of ventilation system air intakes and exhausts (in and out of the house, not each room) with design flow greater than 30 cfm